Journal Homepage: -www.journalijar.com
INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)
Article DOI:10.21474/IJAR01/5539
DOI URL: http://dx.doi.org/10.21474/IJAR01/5539

RESEARCH ARTICLE

CONCHA BULLOSA AND ITS ASSOCIATION WITH DNS AND SINUSITIS.

Dr. Yassar Shiekh[1], Dr. Arshed Ali [2], Dr. Abdul Qayoom Lone[3], Dr. Iqbal Bhat[4] and Dr.Shoket Ali[5].

1. Senior Resident in Deptt. Of Radiodiagnosis & Imaging, Government Medical College, Srinagar.
2. Resident in deptt. of ENT, Head & Neck Surgery , Government Medical College, Srinagar.
3. Specialist in ENT ,Head & Neck Surgery, District Hospital Baramulla.
4. Resident in Deptt. Of Radiodiagnosis & Imaging, Government Medical College, Srinagar.
5. Intern in Government Medical College, Jammu.

Manuscript Info

Manuscript History

Received: 04 August 2017
Final Accepted: 06 September 2017
Published: October 2017

Abstract

Background and Purpose: The incidence of middle turbinate pneumatization, or concha bullosa, has been well described in the literature. In this study, we sought to analyze the incidence of concha bullosa and any correlation with nasal septal deviation and paranasal sinus disease.

Methods: We retrospectively reviewed findings of 140 consecutive paranasal sinus CT studies conducted between January 2016 and December 2016. All examinations were performed for evaluation of a symptom referable to the sinonasal region. Paranasal sinus inflammatory disease was identified and graded as mild, moderate, or severe. If a concha bullosa was present, it was graded in size as small, moderate, or large. If bilateral concha were present, sizes were compared and when one was larger, it was identified as dominant. When nasal septal deviation was present, it was graded as mild, moderate, or severe. The direction of nasal septal deviation was identified as the face of the convex surface.

Results: There was a clear association between the presence of a unilateral concha, or a dominant concha (in the case of bilateral concha), and the presence of nasal septal deviation (P = 0.012). In every case, there was some preservation of air channels between the dominant concha and the nasal septum. 71.2% of patients with concha bullosa had paranasal sinus inflammatory disease; 76.54% of patients without concha bullosa also had some form of inflammatory disease.

Conclusion: Concha bullosa is a common anatomic variant. There is a strong association between the presence of a concha bullosa and contralateral nasal septum devaition. Nasal septal deviation away from the dominant concha, with preserved adjacent air channels, suggests that the deviation is not a direct result of mass effect from the concha. No increased incidence of paranasal sinus disease exists in patients with concha bullosa.

Corresponding Author:-Yassar Shiekh.
Address:-Senior Resident in Deptt. Of Radiodiagnosis & Imaging, Government Medical College, Srinagar.

Introduction:-

Concha bullosa, also known as middle turbinate pneumatisation, is a fairly common condition affecting approximately 35% (range 14- 53%) of the population[1]. Most of the patients with concha bullosa are asymptomatic and are detected to have the same upon evaluation of headache. The wide range of prevalence is attributable to variability in the definition used for the diagnosis. Bolger et al[2] has divided the pneumatization of the middle concha into three groups. 1. Lamellar type -Pneumatization of the vertical lamella of middle turbinate. 2. Bulbous type - Pneumatization of the inferior part of middle turbinate. 3. Extensive type - Pneumatization of both the vertical lamella and the inferior part of middle turbinate.

Many patients with concha bullosa have been found to have co-existent deviation of the nasal septum and sinusitis. The relationship of concha bullosa to paranasal sinus disease continues to be debated [3,4]. Similarly, the role of nasal septal deviation in the etiology of sinusitis remains unclear. Some studies suggest significant relation between concha bullosa and sinus disease, while others have found little or no relation. Herein we have done a retrospective analysis of the CT PNS in order to assess the relationship between concha bullosa, deviated nasal septum (DNS) and sinusitis.

Aims And Objectives:-

1. To study the etiological role of concha bullosa in nasal septal deviation.
2. To study the relationship between concha bullosa and sinusitis.

Materials and methods:-

We retrospectively searched our radiology database for all paranasal sinus CT findings obtained between January 1, 2016, and December 31, 2016. CT was performed on Siemens Somatom Sensation Open (Erlangen, Germany) to obtain 2.5–3.0 mm axial and coronal studies of the paranasal sinuses. Nasal vasoconstrictors were not administered. All patients were referred for CT owing to a clinical symptom presumably referable to the sinonasal region. Patient histories were not taken into account. Therefore, the data were not sorted by specific patient complaints or symptoms. A total of 140 consecutive CT studies were identified. Of these cases, patients with history of either a tumor or prior surgery were excluded from the study. The examinations were reviewed by three neuroradiologists and any differences in opinions were resolved by consensus. The left and right sides of each of the frontal, ethmoid, sphenoid, and maxillary sinuses were assessed separately for the presence of mucosal disease. This disease was evaluated as either being present or absent. A concha bullosa was defined as being present when more than 50% of the vertical height (measured from superior to inferior in the coronal plane) of the middle turbinate was pneumatized. A concha was subjectively assessed as being absent, small, moderate, or large. If bilateral concha were present, they were assessed as being equal in size or one was designated as the dominant concha. Deviation of the nasal septum was subjectively assessed as being absent, mild, moderate, or severe, and the direction of deviation was described by the convexity of the septal curvature.The preservation or obliteration of the air channel between a concha (unilateral or dominant concha) and the nasal septum was also assessed. SAS statistical was used to summarize the data. Analysis was performed with chi-square test.

Results:-

The study was conducted on 140 patients from January 2016 to December 2016. These observations were drawn from the findings of CT paranasal sinus. The mean age of the patients was 29.6 years (range, 10–70 years). There were 82 female (58.6%) and 58 male (41.4%) patients. Of the 140 patients, 95/140 (67.86%) had nasal septal deviation; 50 (52.63%) had a convexity to the right, 42 (44.21%) had the convexity to the left, and 3 (3.16%) had biconvex nasal septal deviation. Of the 140 patients, 59 (42.14%) had at least one concha bullosa, 33 (23.57%) patients had a unilateral concha, and 26 (18.57%) had bilateral concha. Of the patients with bilateral concha, 10/26 (38.46%) had equal sized concha and 16 (61.54%) were judged as having a larger, dominant concha. Overall, 49/140 (35%) patients had either a unilateral or dominant (if bilateral) concha. Of all 140 patients, 91 (65%) had either no concha or bilateral concha of equal size .

When considering patients with either a unilateral or dominant concha and the presence or absence of nasal septal deviation, 38/49 (77.55%) of patients with a unilateral or dominant concha had nasal septal deviation, but only 11 (22.45%) with a unilateral or dominant concha did not have nasal septal deviation; 51/91 (56.04%) of patients without a unilateral or dominant concha had nasal septal deviation, and a similar number, 40/91 (43.96%), of patients without a unilateral or dominant concha did not have nasal septal deviation . In patients with a left sided

unilateral or dominant concha, 17/23 (73.91%) had right-sided nasal septal deviation, 2 (8.7%) had left-sided nasal septal deviation, and 4 (17.39%) had no nasal septal deviation. In patients with a right-sided unilateral or dominant concha, 18/26 (69.23%) had left-sided nasal septal deviation, 3 (11.54%) had right sided nasal septal deviation, and 5 (19.23%) had no nasal septal deviation. There was a strong association between a unilateral or dominant concha and nasal septal deviation (P = .012). When considering the relationship of sinus disease and nasal septal deviation, 72/95 (75.79%) of patients with nasal septal deviation had some sinus disease, and 32/45 (71.11%) without nasal septal deviation had some sinus disease (P = 0.55). Of all 140 patients, 104 (74.29%) had some sinus disease; 42/59 (71.19%) of patients with a concha had sinus disease, and 62/81 (76.54%) of patients without a concha also had some sinus disease (P = 0.474). The relationship between a unilateral or dominant concha and right sided sinus disease was not significant, and the relationship between a unilateral or dominant concha and left-sided sinus disease was not significant**.**

Specifically, there was no association between the presence of a concha bullosa and an increased incidence of disease in any ipsilateral sinus.

Discussion:-

Concha bullosa, defined as pneumatization of the middle turbinate, is a common anatomical variant. Most patients with concha bullosa are asmptomatic, who do not require any surgical intervention.

The prevalence of concha bullosa ranges from 14–53% in the literature [1, 3, 4], as assessed on the basis of CT findings. One of the explanations given for the wide reported incidence of concha bullosa is that the definition of a conchabullosa has varied among studies. Some authors have defined a concha as any aeration of the middle turbinate, even if the aeration is restricted to the upper non-bulbous portion of the turbinate. Others have restricted the definition of a concha bullosa to those cases wherein the aeration extends caudally into the bulbous portion of the middle turbinate (2–12). In our study, we adapted the definition of a concha as a middle turbinate with pneumatization extending caudally into its bulbous portion and was an easily measured criterion on coronal CT studies (Fig 1)

In our study, the concha bullosa was present in 42.14% of the patients in comparison with the study conducted by Stallman et al.

The population studied was referred for CT owing to a specific symptom presumably related to potential disease in the sinonasal region. Therefore, statistical inference of our results applies only to a symptomatic population. The incidence of concha bullosa, sinusitis, nasal septal deviation, and associations thereof apply only to patients who present to a healthcare provider with complaints potentially caused by sinonasal disease. No conclusion about the general population is made from the results of this study.

With regard to nasal septal deviation, it is reported in 20–31% of the population and severe deviation has been noted as a contributing factor for sinusitis (13 - 15). Another study reported a possible causal relationship between concha bullosa or septal deviation and sinus disease (16). Conversely, one study did not demonstrate a causal relationship between nasal septal deviation and sinusitis (17). We defined nasal septal deviation as any bending of the nasal septal contour as evaluated on coronal CT studies. The direction of the deviation was defined by the side of the convexity of the curvature. We found that nasal septal deviation of some degree was present in 75.79% of the cases. There was no relationship found between nasal septal deviation and sinus disease.

We also found that there was a strong relationship between the presence of a concha (unilateral or a dominant concha) and deviation of the nasal septal to the contralateral side**(*P* = 0.012),** which is statistically significant (with most patients having concha bullosa on the roomier side). We also found, however, that there was always maintenance of the nasal air channel between the medial aspect of the concha (unilateral/dominant concha) and the adjacent surface of the nasal septum. This implies that the deviation of the septum away from the concha is not the result of concha pushing the septum. The exact developmental relationship between the two still appears to be unknown

Some reports have suggested a relationship between the presence of a concha bullosa and sinusitis (13, 16), but other reports have found no direct relationship (18, 19). We found no correlation between the presence of a concha

bullosa and sinus disease. 71.19% of patients with a concha had sinus disease, but 76.54% of patients had sinus disease without a concha. This relationship held true for unilateral and contralateral sinusitis.

Conclusion:-

When a unilateral or dominant concha bullosa is present, there is a strong statistical relationship with contralateral nasal septal deviation while the air channel between the concha and the nasal septum is preserved. There is no statistical relationship between nasal septal deviation and the presence of any sinus disease.

Fig. 1 Coronal CT scan of the paranasal sinuses shows a large left concha bullosa with mild deviation of the nasal septum convexity to the right. Note that there is preservation of the air channel between the concha and the nasal septum.

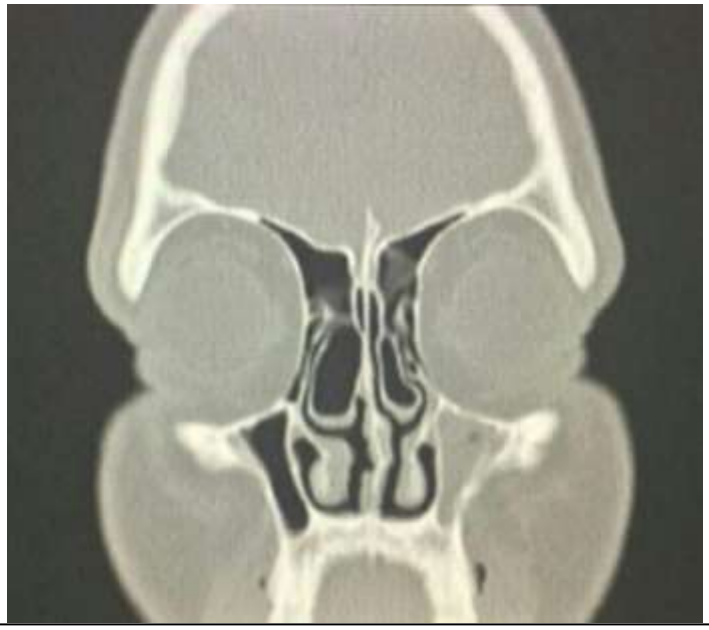

Fig 2. Coronal CT scan of the paranasal sinuses shows moderate sized concha bullosa bilaterally, with the one on the right sidebeing slightly larger, or dominant. There is mild deviation of the nasal septum convexity to the left. Note that there is some loss of the air channel between the dominant concha and the nasal septum .There is mucosal disease in left maxillary sinus.

Fig. 3:- Coronal CT scan of the paranasal sinuses shows moderate sized concha bullosa bilaterally, with the one on the right side being larger, or dominant. There is severe deviation of the nasal septum convexity to the left. Note that there is preservation of the air channel between the concha and the nasal septum bilaterally. There is mucosal disease in left maxillary sinus.

Bibliography:-

1. Stallman JS, Lobo JN, Som PM. The incidence of concha bullosa and its relationship to nasal septal deviation and paranasal sinus disease. AJNR Am J Neuroradiol. 2004;25 (9): 1613-8.
2. Bolger WE, Butzin CA, Parsons DS. Paranasal sinus bont anatomic variations and mucosal abnormalities: CT analysis for endoscopic sinus surgery. Laryngoscope 1991; 101: 56-64.
3. Lloyd GA. CT of the paranasal sinuses: study of a control series in relation to endoscopic sinus surgery. *J LaryngolOtol*1990;104:477–81
4. Lloyd G, Lund V, Scadding G. CT of the paranasal sinuses and functional endoscopic surgery: a critical analysis of 100 symptomatic patients. *J LaryngolOtol*1991;105:181–185
5. Zinreich S, Albayram S, Benson M, Oliverio P. The ostiomeatal complex and functional endoscopic surgery. In: Som P, ed. *Head and neck imaging.* 4th ed. St Louis: Mosby; 2003;149–173
6. Arslan H, Aydinlioglu A, Bozkurt M, Egeli E. Anatomic variations of the paranasal sinuses: CT examination for endoscopic sinus surgery. *AurisNasus Larynx* 1999;26:39–48
7. Basic N, Basic V, Jelic M, et al. Pneumatization of the middle nasal turbinate: a CT study. *LijecVjesn*1998;120:200–201
8. Basic N, Basic V, Jukic T, et al. Computed tomographic imaging to determine the frequency of anatomical variations in pneumatization of the ethmoid bone. *Eur Arch Otorhinolaryngol*1999;256:69–71
9. Scribano E, Ascenti G, Loria G, et al. The role of the ostiomeatal unit anatomic variations in inflammatory disease of the maxillary sinuses. *Eur J Radiol*1997;24:172–174
10. Perez P, Sabate J, Carmona A, et al. Anatomical variations in the human paranasal sinus region studied by CT. *J Anat*2000;197:221–227
11. Zinreich SJ, Mattox DE, Kennedy DW, et al. Concha bullosa: CT evaluation. *J Comput Assist Tomogr*1988;12:778–784
12. Zinreich S, Abidin M, Kennedy D. Cross-sectional imaging of the nasal cavity and paranasal sinuses. *Operative Techniques Otolaryngol Head Neck Surg*1990;1:93–99
13. Shin HS. Clinical significance of unilateral sinusitis. *J Korean Med Sci*1986;1:69–74

14. Lebowitz RA, Brunner E, Jacobs JB. The aggernasi cell: radiological evaluation and endoscopic management in chronic frontal sinusitis. Operative techniques. *Otolaryngol Head Neck Surg*1995;6:171–175
15. Wanamaker H. Role of Haller's cell in headache and sinus disease: a case report. *Otolaryngol Head Neck Surg*1996;114:324–327
16. Calhoun KH, Waggenspack GA, Simpson CB, et al. CT evaluation of the paranasal sinuses in symptomatic and asymptomatic populations. *Otolaryngol Head Neck Surg*1991;104:480–483
17. Hamdan AL, Bizri AR, Jaber M, et al. Nasoseptal variation in relation to sinusitis: a computerized tomographic evaluation. *J Med Liban*2001;49:2–5
18. Danese M, Duvoisin B, Agrifoglio A, et al. Influence of nasosinusal anatomic variants on recurrent, persistent or chronic sinusitis. X-ray computed tomographic evaluation in 112 patients. *J Radiol*1997;78:651–657
19. Lam WW, Liang EY, Woo JK, et al. The etiological role of concha bullosa in chronic sinusitis. *EurRadiol*1996;6:550–552